

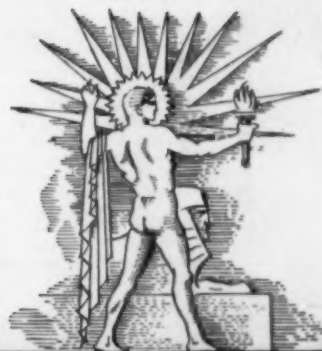
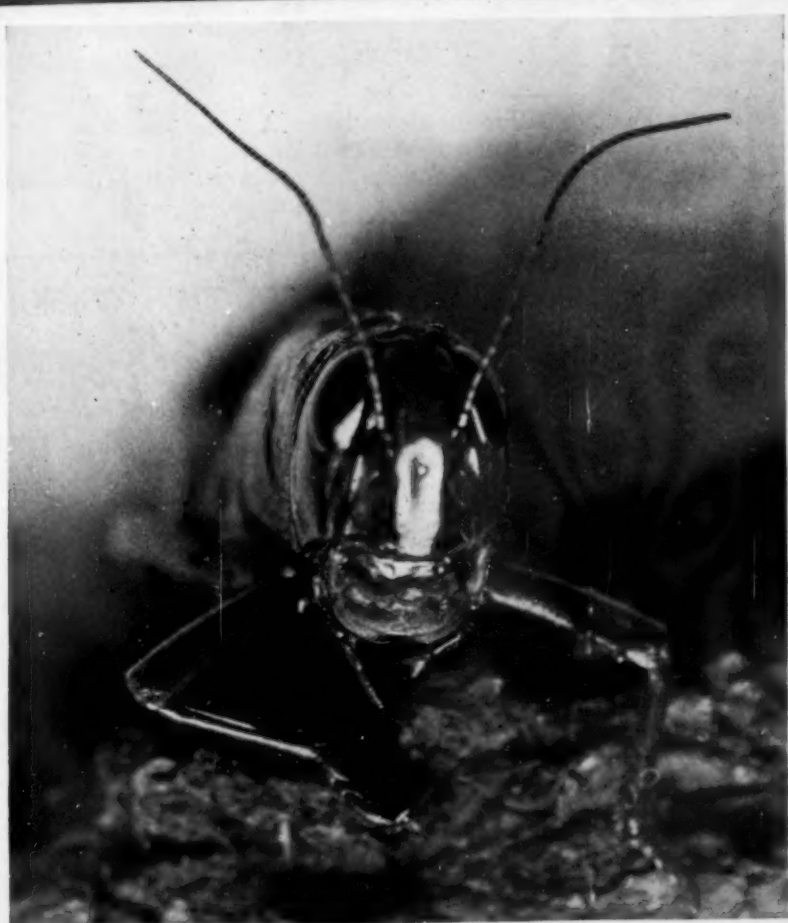
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JUL 14 1931

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



JULY 11, 1931

Hatched by Heat to Invade Northwest

See Page 19

A

SCIENCE SERVICE PUBLICATION

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VOL. XX

No. 535

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Summary ofCurrent
Science

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DO YOU KNOW THAT

Vegetable oils are said to be a good fuel for some Diesel engines.

Wheat, rye, and whole wheat bread are combined in one loaf devised by a Northwestern baker.

The National Geographic Society has presented the U. S. National Museum with more than 1,000 bird skins collected in Venezuela.

Weather men call people who are affected to an abnormal degree by weather "meteoropaths."

Eight railroad companies operating in Missouri have converted their rights-of-way into homes for wild birds and animals.

Deer appear inclined to eat all kinds of available vegetable food and will try anything new, according to Pennsylvania foresters.

Hummingbirds prefer red to any other color in flowers.

Sponges are now being made artificially from cellulose.

One-tenth of the harvested hay crop in the United States is lost each year through spontaneous combustion.

An economist reports that, allowing five people to a family, railroads of the United States directly support almost eight million people.

The State of Para, Brazil, in the Amazon Valley, has more than 1,000 kinds of trees, says Dr. B. E. Dahlgren, botanist of the Field Museum.

A patent exposition, at which inventors will display their ideas for prospective buyers, will be held in Chicago this autumn.

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Science Service presents over the radio, an address

SEA BEACHES AND THE TIDE

By Captain Paul C. Whitney, chief, Division of Tides and Currents, U. S. Coast and Geodetic Survey, who will give information of special interest to those who spend their vacation by the sea.

Friday, July 17, at 2:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

ENTOMOLOGY

Hot Waves Bring Northwest Grasshopper Invasion Menace

Great Drought and Mild Winter Conspired to Produce Pests In Hordes That Are Already Stripping Farms of Green

See Front Cover

GRASSHOPPER outbreaks in Nebraska and South Dakota may be only the advance guards of a much worse and more widespread insect horde to arrive before very long if hot waves continue to sweep the country. So say entomologists of the U. S. Department of Agriculture. The coming of these insects in June was in a sense premature, they state, for even in bad grasshopper years the pest does not ordinarily assume serious proportions until July.

Just how bad the grasshoppers can be expected to be in the West this year it is impossible as yet to estimate. The Bureau of Entomology, however, has a number of scouts in the field, investigating the areas most under suspicion as probable breeding centers of the hoppers, and battle plans are being laid. The principal means of combat against the grasshopper armies is chemical warfare: poisoned bait, consisting of a molasses-sweetened bran mash loaded with sodium arsenite or other arsenical, is distributed where they can find it.

Severe Winter Kills Them

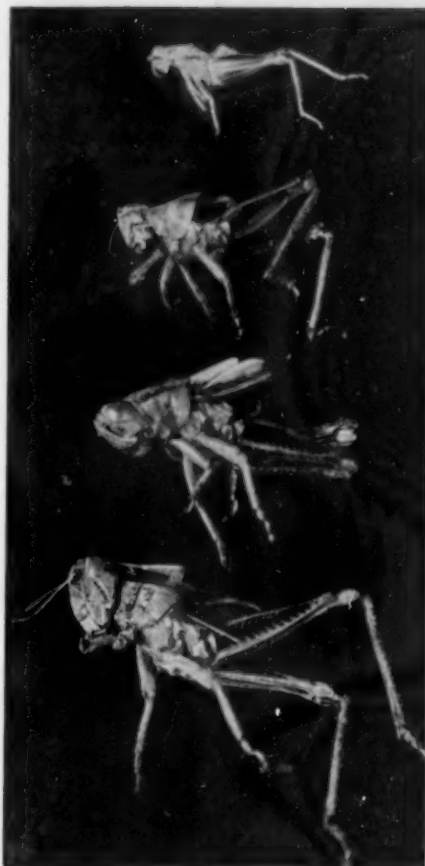
Events of last summer and winter have conspired to make the present situation threatening, the Federal entomologists explain. Last year there were moderately severe grasshopper outbreaks in a number of western states. It was feared at first that the situation might become serious even then, but the hoppers failed to develop in really large numbers. However, there were enough of them to deposit huge quantities of eggs in the drought-hardened soil.

But even with myriads of grasshopper eggs in the ground, the country can still be spared a grasshopper plague during the following year, if only the winter is severe enough. January and February are often the northwestern farmer's best friend. However, last winter was a very mild one, so that a relatively large proportion of the eggs survived. Early warm weather this year brought forth the advance guards and continued heat may call out the main army.

The grasshoppers that are raising the trouble today are the direct descendants of the ones that caused the terrible "grasshopper years" in the pioneer West, and near relatives of the locusts that Moses called up out of the desert to scourge hard-hearted Pharaoh for breaking his word to let the Children of Israel go. They are long-winged grasshoppers, with considerable powers of flight, and the most unselective appetites in the insect world. They will eat literally anything they can take a bite out of, and when a horde of them hits a farm it simply cleans the place up.

Grasshoppers are unlike the insects used most commonly in the schools as nature-lesson objects. They do not pass through the stages of grub or caterpillar, pupa or chrysalis, and full-grown insect or adult, as do such insects as bees, ants and butterflies. When a grasshopper egg opens, a tiny grasshopper comes out. It looks as much like a grown-up grasshopper as a baby looks like a grown-up man. Such an infant grasshopper is called by the wholly over-complimentary name of "nymph" by entomologists.

Grasshopper nymphs feed greedily and grow rapidly. They shed their skins



BABY CLOTHES

As the ravenous insect grows he leaves worn-out skins behind him, each discarding four skins before becoming full-grown.

four times, with each change attaining longer wings and a more adult-like appearance. Finally, after the last change, they have wings they can use for flight, and then they are ready to launch themselves into the air in streaming clouds.

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MEDICINE

Female Gland Extract Checks Bleeders' Disease in Males

ONE of the female sex hormones may play an important part in the future treatment of the strange bleeders' disease known as hemophilia, if the preliminary studies just reported to *Science* by Dr. Carroll La Fleur Birch of the University of Illinois College of Medicine are confirmed.

This condition is a rare disease of the blood with a strong hereditary tendency. Only males suffer from it, but it

is transmitted through the unaffected women of the family. The outstanding symptom is a tendency to excessive bleeding which may be spontaneous or may result from a slight injury that would pass unnoticed in an ordinary individual.

A strong hemophilic tendency exists in several of the royal families of Europe today. The oldest son and heir of the recently deposed King of Spain suf-

fers from this disorder, as did the ill-fated Czarevitch of Russia. A feature of the disease is the fact that it takes the blood much longer to clot than is usual.

Dr. Birch reported that he and his associates had located a family of hemophiliacs in southern Illinois whose family records were traced back 125 years through six generations. There had been sixteen bleeders in this family, seven of them now living.

Dr. Birch started his investigations on the theory that if the women of such a family can transmit the disease, they must potentially have it, but something in the female mechanism holds it in abeyance. The greatest difference between males and females is in the sex

organs. He therefore treated two boys who were marked sufferers from the disease with ovarian extract and implanted ovarian tissue in one of them.

These boys had scarcely ever been free from hemorrhage for a month at a time before this treatment. After the treatment, the boy who had the extract from the female glands was free from bleeding for eleven months, and the one who had the ovarian transplant was free from bleeding for five and one-half months.

Dr. Birch and associates are continuing their studies on this disease, as their present experiments are incomplete, he reported.

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ASTRONOMY

Super-Giant Star Discovered In Large Cloud of Magellan

A SUPER-GIANT variable star with light flashing up and down so vigorously that its brightness changes from 12,000 to 33,000 times that of the sun within less than one month has been found in the Large Cloud of Magellan, a distant mass of stars visible in the sky of the southern hemisphere. This star is but one of many super-giant variables in the great star cloud that lies at a distance of ninety thousand light years from the earth. A light year is approximately six trillion miles.

One star out of seventy has been found to be variable, among the hundred thousand super-giants in the Large Cloud. In 1908 Miss Henrietta S. Leavitt, at the Harvard Observatory, published a list of eight hundred variable stars which she found in the Large Magellanic Cloud. Her discoveries were made by the method of superposing a negative plate of the Cloud on a positive, and examining the double images so obtained. The two plates used were taken at different times, and the changes of light of the variables in the interval between made their images look bright on one plate and faint on the other. Thus the pulsating stars were detected. An examination of several such pairs of plates, taken at different intervals of time to reveal the different periods of variation, resulted in the discovery of the variables.

Since Miss Leavitt's time, such work has been done in the discovery of varia-

bles in the Milky Way. But until very recently no further hunt was made in the Magellanic Clouds. Within the past few years, however, a number of new photographs of this galaxy have been taken at the South African station of the Harvard Observatory. These new plates, when recently examined, have yielded a rich harvest of some seven hundred hitherto unknown variable stars in the same regions that contain the earlier discoveries.

The finding of these fifteen hundred variables, together with the probability that there are still others too faint to be detected on the photographic plates, furnishes important information on the structure of galaxies, the distribution in brightness of stars, and the distance of the systems that contain them.

Important Relation Verified

One of the outstanding results of this recent survey has been the verification of the important period-luminosity relation found for variable stars. Miss Leavitt noticed, in determining the period of time it took the variables to complete one pulsation cycle, that this period was directly related to the brightness of the star. From her data, and from the data derived from variables in star clusters, Dr. Shapley established the period-luminosity relation, by means of which the intrinsic brightness and therefore the distance of the stars can be determined. This relation has done more than any other empirical fact to give

us knowledge of the distances of stars and clusters and the structural form of the Milky Way.

It is significant that new periods derived for the Magellanic Cloud variables confirm this relation. Not only in the Large Cloud, but in the Small Cloud of Magellan as well, this powerful astronomical tool has found its verification.

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ENGINEERING

Copper Put Into Auto Valves To Make Them Last Longer

ONE of the weak spots of the modern automobile engine may be strengthened as the result of researches of A. T. Colwell, of Cleveland, which have been reported to the Society of Automotive Engineers.

Mr. Colwell hollowed out the centers of valve stems of internal combustion engines and filled them with copper. He found that this treatment added both to their efficiency and life.

The explanation lies in the fact that copper conducts heat much better than steel, it was explained.

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GOOD TO EAT—AND SAFE

If you see any mushrooms that look like this, gather all you can get of them. These are the edible morel, one of the most delicious of all mushrooms, and they have the further great advantage that nothing that looks at all like them is poisonous.

ENGINEERING

New Transmission System May Bring Power Greater Distances

Invention of Pittsburgh Engineer Expected to Make Possible Development of Far Distant Super-Power Projects

A NEW SYSTEM of electrical transmission that will carry many times more power than is now sent over the greatest transmission lines and will take it twice as far as is now possible, is the invention of Clarence A. Boddie, an engineer of Pittsburgh.

The invention is expected to make possible the construction of super-power projects which have heretofore been impossible because the power plants would have to be located too far from industrial centers where the electrical energy would be used.

Two such projects that have become sound economic possibilities as a result of the invention, according to Mr. Boddie, are the development of the St. Lawrence River and the building of a huge steam plant in the heart of the Pennsylvania coal fields to supply New York and Philadelphia with electricity.

Already the world's largest hydro-electric power plant at Conowingo, Md., is becoming inadequate to supply the increasing eastern power demands, Mr. Boddie explained. To meet these additional power needs, engineers are already planning a huge coal-burning steam plant to be located at Sunbury, Pa. They prefer to put this plant farther west in the heart of the cheap soft coal region, but because of the limitations of present transmission lines they are designing it for the anthracite region at Sunbury, which is much nearer New York and Philadelphia, Mr. Boddie said. He hopes that his new transmission system will make possible the more favorable location of this plant.

With the new system, engineers would also be able to send power 500 miles from the St. Lawrence River to industrial centers of the East, whereas with present lines it is possible to send electricity only about 250 miles in useful large blocks without too great loss.

Mr. Boddie's transmission line is exactly like those now in use, except for one simple change: Instead of using only one wire at a high voltage he uses two, or three, or four, or five, all at the

same voltage—the more, the better, within practical limits of construction. Present transmission lines are usually made of three wires, each insulated from the others and at a different voltage.

If Mr. Boddie rebuilt this line he would substitute a number of wires for each single one. Instead of one old cable, let us say that he uses four, as the drawing shows. These four cables are separate wires yet they are one conductor; that is, they are not insulated from each other and if the wind blows them together no harm is done, there is not even a spark. The old three-wire, three-conductor transmission line has become a twelve-wire line, each conductor being made of four wires.

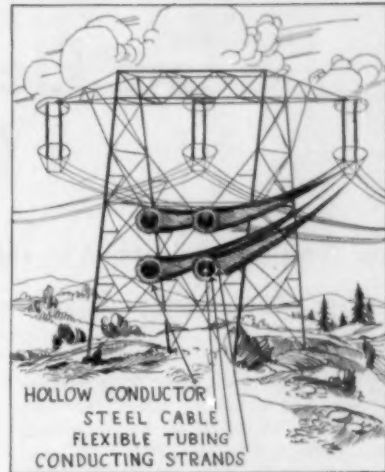
Easier to Operate

A simple change! Let us see what good it does.

Suppose our first three-wire, three-conductor line operated at 220,000 volts, the highest potential of the greatest transmission lines in America today. After we make it a twelve-wire line it can be operated at 575,000 volts. And it can be made to carry eight times as much power as the old 220,000-volt line. It is also found to be easier to operate than the lower voltage line.

An application of a simple principle of physics, is the way Mr. Boddie explains this discovery that may bring cheaper power and consequently more leisure to everybody in America. And there is one apparently little thing, he is careful to add, on which the whole new system depends. Each of the four wires must be just as large as the single wire of the old system.

Transmission lines today cannot operate at higher voltages because the electricity will leak off into the air. Engineers have found that electricity will leak away from a small wire more readily than from a large one, even though this large wire is hollow. The engineers might easily solve the problem by making transmission lines out of copper stovepipes, if ice and wind would not tear them down. They would



EIGHT TIMES AS MUCH

Power can be sent over Mr. Boddie's four-wire conductor transmission line as over the present greatest lines, engineering calculation shows. More than twice the voltage is expected to be used without exceeding the corona limit.

be large enough to have a low "breaking-down point," and hence would carry a great amount of power without losing it to the air.

Instead of using impractical stovepipes, Mr. Boddie has simply increased the number of wires per conductor. In this way he gets a surface area as great as that of a stovepipe.

Mr. Boddie has written a book that explains the new system, not in terms of stovepipes, but with the exactness of engineering mathematics. He has sent the book to prominent engineers throughout the country asking them to criticize and to pick flaws with his system, and many have already replied, giving their professional approval to the plan.

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PALEONTOLOGY

Mastodon Remains Found in Turkey

TEETH, tusks and parts of the skeletons of mastodons have been found along the coast near Istanbul, where two cavern regions open on the sea. The finds were made by a Turkish physician, Dr. Fikri Servet, and have been reported to *Science* by Prof. George D. Hubbard of Oberlin College, who is resident in Istanbul during the present year. There are also indications of human occupation in one of the caves. The exploration of the region has only been begun; and Prof. Hubbard promises a fuller report after his return to the United States.

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CHEMISTRY

Some Elements Yielded by Yttrium

"A Classic of Science"

How One New Earth After Another Appeared as Chemists Purified Rare Minerals From the Mines of Ytterby

These extracts show the long process of trial and error by which the rare earths were worked out. The elements derived from Yttrium as now accepted are Gadolinium, Terbium, Dysprosium, Holmium, Erbium, Thulium, Ytterbium and Lutecium.

ON YTTERBINE, a New Earth Contained in Gadolinite. Note by M. C. Marignac. In *COMPTES RENDUS*, Tome 87, Paris, 1878.

AS A RESULT of the researches which I have made upon the earths from gadolinite, researches which had for their object and which have for their result the confirmation of observations by M. Delafontaine upon the existence of terbium and of a new base belonging to the same group, to which he gave the name *philippine*, I have obtained a few grams of an earth presenting all the characteristics which belong to erbium, following the classic work of MM. Bahr and Bunsen and of MM. Cleve and Hoglund.

Process Unlike Others

I ought to state, however, that the process by which I separated it from the other earths of gadolinite is not absolutely identical with that which those chemists used. Bunsen's process consists of heating the mixed nitrates until red vapor appears, redissolving in boiling water and separating out the nitrite rich in erbium which precipitates in small needle-shaped crystals upon cooling the solution. As for me, I was able to carry the decomposition of the nitrates much further, up to the moment that the mass became sticky. Upon treating the mass with boiling water, there remains an insoluble residue in which the erbium is concentrated. By one or the other of these processes, repeated a very great number of times, we end by obtaining an earth of a pure rose color, which is erbium.

In my first researches, I stopped the treatment as soon as I arrived at a rose

colored earth whose equivalent weight, lying between 128 and 129, corresponded to that which has been assigned to erbium.

More recently, I have again taken up the products thus obtained, as I wished to assure myself whether, by continuing these same operations, I should obtain any further increase in the equivalent weight. Instead, I observed a fact which surprised me very much.

Whereas, in the first part of my work, the gradual increase of the equivalent weight corresponds to a deepening in intensity of the rose color and of the absorption bands characteristic of erbium, there came a time when, the equivalent weight continuing to increase slowly, the rose color and the absorption lines diminished quite rapidly, so much so that the last product obtained was perfectly white, its salts colorless, and no longer giving the absorption lines.

The last three products obtained gave the equivalent weights 130.4, 130.6 and 130.8. The first two still showed a sensible rose color, especially in the oxalate and sulphate crystals. The number 131 can be set approximately as the limit of equivalent weight which may be reached, if one can operate upon a sufficient quantity of material to carry this method of purification far enough.

It is evident from this that the earth which I extracted from gadolinite, and which I believed to be erbium, was only a mixture of two distinct oxides. One, a pure rose color presenting a very characteristic absorption spectrum, ought to keep the name *erbium*, since these are the characteristics which have been considered as more distinctive of that base. The other is a new base, belonging to the same group, and for it I propose the name *ytterbium*, which will recall its presence in the mineral from Ytterby, and its similarity to yttria, on the one hand, by its lack of color, to erbium, on the other by the magnitude of its equivalent weight, with both of them by the whole of its properties. . . .

ON TWO NEW ELEMENTS IN ERBINE. Note by M. P.-T. Cleve. In *COMPTES RENDUS*, Tome 89, Paris, 1879.

Toward the end of last year, M. Marignac discovered in erbium, till then considered an oxide of a single metal erbium, the oxide of a new metal, ytterbium, very strongly characterized. A short time afterward, M. Nilson found in erbium another oxide, scandium, whose salts are colorless like those of ytterbium. The substance which gives to the salts of erbium the red color and their beautiful absorption spectra, that is to say, the true erbium, is still unknown. I proposed to extract from the old erbium its coloring principle. I had at my disposal a considerable quantity of material almost entirely free from ytterbium; M. Nilson very kindly gave me his precious residues from the extraction of scandium and ytterbium; nevertheless I found it absolutely impossible to obtain a red oxide of constant molecular weight, even after hundreds of decompositions.

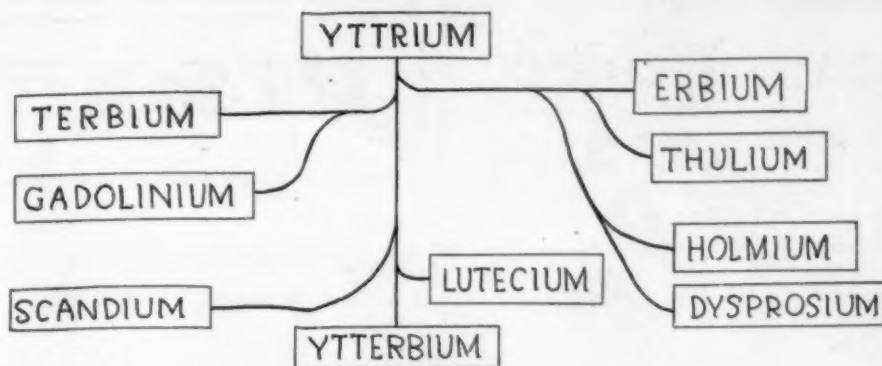
Another New Oxide

I have been driven, since then, to postulate the presence of still another unknown new oxide, so I asked M. Thalen to examine the absorption spectrum of the fraction which I regard as most pure in erbium, and at the same time to compare that spectrum with spectra of residues rich in ytterbium and yttria. Some absorption bands in the last fractions suggested the idea that the color of erbium is due to the presence of three oxides in the absorption spectra. I therefore combined the redder fractions, of molecular weight 126 to 127 (RO), and submitted them to a long series of decompositions, treating one fraction (A) for ytterbium, another (B) for yttria, and a third intermediate between them in

YOSEMITE VALLEY

with its Bridal Veil Falls of
"white water-dust"

described by Clarence King in
THE NEXT CLASSIC OF SCIENCE



THE FAMILY TREE OF YTTRIUM'S DESCENDANTS

This diagram shows the way chemists isolated the new earths from the Swedish rare mineral, gadolinite.

which the true erbine ought to become concentrated. At the same time, I tried to concentrate the coloring matter in the residues rich in ytterbium (A) and in yttria (B). When I had pushed the decompositions until obliged to stop for lack of material, I sent the five fractions for examination by M. Thalen, who had the kindness to study them with great care. . . .

We see then that the (absorption) band x pertains to fractions situated near ytterbium, and that it does not exist in the fractions which derive from yttrium. But it is just the opposite with bands y and z ; in fact, these bands, which lack everything found in the residues of ytterbium, appear more and more pure, in proportion as they approach yttrium.

It appears from these researches that the spectrum of the old erbine ought to be attributed to three distinct oxides. In fact, the color of the solutions of the diverse fractions is sensibly different. Thus the fractions treated for ytterbium are colored rose with a tint of violet, the fractions treated for yttria have an orange tint. Although I have a considerable quantity of the mixture of these three oxides, I am convinced that it will be useless to continue these researches until I am able to get still more.

Proposes a Name

As for the radical of the oxide occurring between ytterbium and erbium, which is characterized by the band x in the red part of the spectrum, I propose the name thulium, derived from Thule, the earliest name of Scandinavia. The atomic weight of the metal Tm ought to be about 113 (its oxide being RO); at least, its oxide is concentrated in the fractions which have the molecular weight 129.

The true erbium, to which the common bands should be attributed, probably has an atomic weight of 110 to 111. Its oxide is of a clear rose color.

The third metal, characterized by the bands y and z , which is found between erbium and terbium, ought to have an atomic weight lower than 108. Its oxide appears to be yellow; at least, all the fractions of molecular weight lower than 126 are more or less yellow. I propose for this metal the name of holmium, Ho, derived from the latinized name of Stockholm, in whose vicinity occur so many minerals rich in yttria.

It remains to tender M. Thalen my lively appreciation of the trouble which he has taken with all these researches.

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MEDICINE

New Studies Cast Doubt on Cancer Treatment Value

FURTHER DOUBT on the value of the Coffey-Humber treatment for cancer is cast by a report made by Dr. Howard A. Ball of Los Angeles to the *American Journal of Cancer*.

Dr. Ball examined the tissues of the cancers or other malignant growths on the bodies of patients who had had the Coffey-Humber treatment with suprarenal cortex extract. He compared these with the cancers of patients who had died without having had the Coffey-Humber treatment. There was no evidence that the treatment had had any effect on the cancer.

"No essential change from that usually observed in the characteristics of malignant tissue in far advanced cases could be determined in a series of 89 cases that received the experimental

ZOOLOGY

Drinking Troughs Preserve Rare African Elephants

BOREHOLES have been sunk, and special drinking troughs have been provided, to secure protection for a herd of some forty South African elephants in the Addo Reserve in South Africa. These forty represent the last of a species which are somewhat smaller than their northern brothers in Africa. The absence of water caused these elephants to roam off the reserve, doing damage to neighboring farms.

Another huge preserve is being established between the Aub and the Nosob rivers in the Northwestern Cape Province, and here the gemsbuck, one of the most beautiful of South African antelopes, will be preserved. This animal is very nearly extinct in other parts of the South African Union.

A third reserve will be in the Bredasdorp district, where the spotted deer, only ninety of which are left, will be protected. Twenty-five of these animals will be fenced in, and every effort made to encourage their increase. It is proposed to place these new reserves under the National Parks Board of South Africa, which now administers the Kruger National Park.

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suprarenal cortex extract (Coffey-Humber)," he reported.

He also found that the cancer had spread to the suprarenal glands in a strikingly large number of cases of the group that had had the Coffey-Humber treatment. This is all the more significant since Coffey and Humber hold the theory that these very glands produce a principle governing cell growth, and base their treatment on this theory. It would seem that such an organ which had the power of regulating cell growth, if it existed, would be least prone to cancer in the first place and the least frequent place for secondary cancers to develop, Dr. Ball commented.

Dr. Ball made his investigation while research pathologist for the W. K. Kellogg Foundation of California.

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PSYCHOLOGY

"Bright" Child Has Hard Time of It, Report Shows

DON'T FEEL SORRY if your child isn't the brightest in school, because the mentally superior youngster usually has a hard time of it and makes himself a special problem in the matter of social adjustment.

In a report to the National Committee for Mental Hygiene, Dr. Leta S. Hollingworth, of Columbia University, showed that child prodigies find themselves handicapped in many respects. The brilliant boy or girl may become indifferent to school work and fall into habits of idleness and daydreaming as a result of the ease in which the ordinary lessons are mastered. Finding themselves uninterested in the same games as their older and larger classmates and becoming a constant target for their attacks, the "bright" ones suffer considerably.

For the gifted girl, particularly, the matter of recreation is difficult because her early maturity develops in her an interest in the rougher activities of boys which her sex inevitably prevents her from pursuing.

In the home, Dr. Hollingworth stated, the situation is sometimes very embarrassing to the parent of the precocious offspring. By the age of six or seven the child may be insisting on logical, satisfying answers to such questions as "Who made me? Where did I come from? Where will I go when I die?" In addition, an almost devilish cleverness as well as a marked tendency to argue may be early noted. And where the parent is less intelligent than the child the latter is likely to run the household and thus reverse the customary social order.

Science News Letter, July 11, 1931

PLANT PHYSIOLOGY

Sliding Frame Duplicates Effects of Wind on Trees

TO DETERMINE the effect of wind strain on the growth of trees, Dr. W. S. Cooper of the University of Minnesota botany department is carrying on an experiment with Monterey cypress trees. These cypress trees, which have always proved of interest to tourists because of their fantastic shapes, grow native on the rocky coast of California, and are constantly exposed to the wind from the ocean.

How does wind effect the growth of

the woody structure of these trees? The natural assumption is that any tree puts on wood in the plane of the wind strain to support itself.

In this experiment, Dr. Cooper has placed thirty-five young Monterey cypress trees in large flower pots. A sliding frame is attached to the trunks of the trees. This is driven by a small motor. The motor causes the frame to slide back and forth, and this makes the trees sway as if in the wind. At the point of contact of the frame and the tree, a rubber insulation is placed to protect the wood from injury. In this manner the trees have swayed nine hours every day for three years.

The results have been contrary to the natural assumption. Dr. Cooper found that until recently the trees were adding wood and getting thicker at right angles to the strain instead of along the plane of wind pressure. However, in the past few months, a slight change has been taking place. There is evidence to show that in the trunk of each tree, above the point of contact with the frame, the wood is becoming thicker in the plane of the wind strain as was originally expected.

A similar experiment was carried on by G. P. Burns of the University of Vermont several years ago. He used white pine trees, however, and conducted the experiment for one year only. His results were the same as Dr. Cooper's in that the trees put on wood at right angles to the strain during that one year.

Dr. Cooper expects to continue his work another two years.

Science News Letter, July 11, 1931

ZOOLOGY

White Rhinoceros Strictly Protected

SIAM'S sacred white elephant bids fair to be matched with a sacred white rhinoceros in Uganda, one of the great British protectorates in Africa. The protection given this rare and diminishing species has become so absolute and exacting that even photographers going into the district to photograph the great beasts are required to obtain a license, and are warned not to do anything to frighten or enrage them. Infractions of this rule are punishable by a fine of a hundred pounds or imprisonment for six months. If the offense is repeated the fine goes up to 250 pounds and the jail sentence is trebled. Anyone killing or wounding a white rhinoceros forfeits his hunting license.

Science News Letter, July 11, 1931

IN SCIENCE

ENTOMOLOGY

Breezes Introduce Errors In Cricket "Thermometer"

THE NUMBER of chirps crickets of certain species make in a minute is a fairly accurate thermometer, provided there is no breeze.

Scientists have long known that changing temperature makes the insects speed up and slow down their chirping rate, and now H. A. Allard, of the U. S. Department of Agriculture, has found that a cricket in a draft chirps faster than one in still atmosphere—exactly 13 chirps a minute faster in the artificial draft Mr. Allard created with an electric fan.

If no breeze had come up but the temperature had risen three degrees Fahrenheit, the cricket would also have increased his rate of noise-making by thirteen chirps a minute.

Science News Letter, July 11, 1931

SEISMOLOGY

Instrument With Pendulum Measures Quake Force

AN INSTRUMENT, that will measure the force of an earthquake that shakes it, was described by Prof. J. A. Anderson of the Mt. Wilson Observatory, before seismologists meeting in Columbia, S. C., recently. It consists essentially of a pendulum free to swing in a given plane but normally resting against a stop. It can be adjusted to indicate a given force of movement by the angle of its swing.

When an earthquake strikes it, the pendulum swings away from its stop. This opens an electric circuit, and causes a semaphore on top of the instrument to drop. It is planned to use seven such pendulums on each installation, each set to indicate a different earthquake force. Then the operator, looking at the set-up after a quake, can tell by the number of semaphores which have dropped how severe the earthquake was. Then simply by resetting the semaphores, he leaves the instrument ready to register the force of the next earthquake.

Science News Letter, July 11, 1931

CE FIELDS

ANTHROPOLOGY

Seek "Black Sand" Indians In Illinois Mound

A PARTY of sixteen University of Chicago students under the supervision of Dr. Fay-Cooper Cole has begun excavation at Indian mounds near Lewistown, Ill., in the hope of discovering information about the oldest known inhabitants of the region.

These most ancient inhabitants have been named the "black sand" people. The name was given them because nine skeletons were found buried in black glacial sand beneath Indian mounds last summer. This year the expedition hopes to recover implements and ornaments which will shed light on the home life and customs of the ancient tribe. The black sand Indians are estimated to have lived at least 2,000 years ago.

Declaring that the search for early inhabitants of the Mississippi Valley is highly important in solving problems of American prehistory, Dr. Cole stated that Fulton County, where the excavations are being made, contains "the most complete data for culture sequence yet found in the Mississippi Valley."

Science News Letter, July 11, 1931

CHEMISTRY

Cheaper Hydrogen For Industry Promised

CHEAPER methods of making hydrogen from powdered fuel were discussed by Dr. Thau, Berlin engineer, at a meeting of the Institute of Fuel and the Institute of Gas Engineers recently in London. Apart from its use in domestic gas, industrial hydrogen is in increasing demand for the synthesis of ammonia gas, for the hydrogenation of oils and probably in the near future will be used for the liquefaction of coal.

The hydrogen is separated from so-called water gas which is made by the action of steam on red-hot coal or coke.

Great efforts have been made in recent years to reduce the price of water-gas by utilizing a cheaper fuel, as production costs are comparatively high. At present the process depends on the use of high-

class lumpy fuel such as coke or coal which is free from small particles.

Dr. Thau pointed out that the size of the fuel is not of so much importance as evenness of grain, which allows an evenly distributed passage of gas over the whole area of the fuel bed in the "producer," where the chemical action takes place.

The first continuously operated water-gas producer to consume powdered fuels instead of lump fuel, continued Dr. Thau, was designed by Dr. Oswald Heller of Aussig, Czechoslovakia. Exhaustive trials of the system have been conducted at the Tegel works of the Berlin Gas Company. The producer is of horizontal cylindrical shape and superheated steam is blown into it at seven different places.

The trials have not yet reached a conclusive end, but water gas can be produced by this process considerably cheaper than previously.

Science News Letter, July 11, 1931

PSYCHOLOGY

Worried, Tired Children More Apt to be Hurt

EVEN CHILDREN who have been given plenty of safety instructions are injured in accidents. This is often due to the mental or physical state of the child at the time he is exposed to danger, Dr. Herbert J. Stack, lecturer in safety education at Columbia University, says in a report to the National Committee for Mental Hygiene.

The worried child, because his mind is preoccupied, is especially prone to accident, Dr. Stack has found. As an example he cited one little girl who was seriously injured by an automobile. The police report read, "Crossing street at intersection against the lights." But Mary said, "I was worried about Mother. Mother has been sick, you know. I wanted to hurry to get home to her, and so I ran fast."

Parents and teachers are urged to provide safe adventures such as scouting and camping for the venturesome youngster who would otherwise hang on the rear end of trolley cars. They are also urged to protect the child from fatigue, because the children who are mentally and physically tired are more susceptible to accidents.

"Those of us who have to dodge taxicabs and other vehicles on our busy streets and highways know how many narrow escapes we have had when we were tired," Dr. Stack said.

Science News Letter, July 11, 1931

PSYCHOLOGY

Smaller Families Not Lowering Mentality

A FALLING birth rate apparently is not lowering the average intelligence of our population. Modern families of three children are just as likely to be bright on the whole as the once customary groups of ten or twelve.

At least the claim of some psychologists that mental capacity increases with order of birth is not substantiated in a study of 2127 cases made by Dr. Hsiao Hung Hsiao at the University of California. In a report published in *Genetic Psychology Monographs*, he concludes that the eldest in the family may have as much or even more brains than his younger brothers or sisters.

First-born children made practically the same scores on a mental test as did the second-born, but the later-born children, he points out, have the advantage of the mother's experience in rearing offspring, the greater chance of intellectual gain from association with brothers and sisters, and frequently the asset of the improved economic or social status of the family. In spite of these handicaps the first-born shows up well by comparison.

Science News Letter, July 11, 1931

BOTANY

Huge 1,000-Year-Old Pine In Crater Lake Park

A GRAND old western white pine, believed to be one of the largest of its kind in the world and estimated to be over 1,000 years of age, has been discovered recently in Crater Lake National Park, Ore. It is 23 feet 2 inches in circumference, the measurements being taken breast-high in accordance with the Spalding rules of measurements. Its height is 140 feet.

The pine is located in a canyon on the middle fork of Anna Creek, two and a half miles south of Government Camp. The east side of the gorge has been subject to heavy erosion, causing the roots of trees in that section to become almost trunks in their own right. But this great tree, growing on the west side of the canyon, has never suffered from the effects of such action.

The great size of this giant tree is particularly striking because Idaho, and not Oregon, is recognized as the real home of the western white pine.

Science News Letter, July 11, 1931

EVOLUTION

The Dog's Family Tree

Dogs, Wolves, Foxes, Bears and Raccoons all Descended From Little *Miacis*; Cats Come in as Second Cousins

By FRANK THONE

WHEN TOWSER teases Tabby and drives her up a tree, or mayhap instead goes whimpering back to kennel with clawmarks on his nose, we have merely been witness to a little family tiff. For dogs and cats are second cousins.

And when a British squire rides to hounds after the fox, and when his longer-legged American or Canadian cousin follows taller hounds after wolf or coyote on the plains of the West, they are exploiting for their own benefit a more intense feud between even nearer animal kinfolk. For dogs are zoologically first cousins to foxes and bears and raccoons, and practically blood-brothers to wolves.

In a general way we have known this for a long time, but the details of the dog's family tree have been worked out only recently. The late Prof. W. D. Mathew of the University of California, who died only a short time after his study was completed, drew up a family tree of the canine clan, in which he placed not only all the living relatives of the dog but also the cousins who have departed this life during the past half-dozen geological generations, leaving no descendants.

Very curious gentry they were, too, some of these cousins who failed to be ancestors. There was one dog, for example, that was bigger than any living bear. Another one had a forehead so bulging and prominent that its skull earned for the species the nickname of "Highbrow Dog."

There are some members of the dog tribe today that seem to be surviving cousins of a long-gone time. They are isolated species, quite unlike their other cousins now living, showing no evidence of having evolved much during the past ten million years or so, and no promise of doing any more evolving. They are canine Tories, resisting all change, hanging on to things as they are, content with surviving.

Two such groups figure in Prof. Mathew's genealogical chart. One of them is the dhole, the wild dog of the Indian

hills, whose fierce packs are said to hunt even the tiger himself. The other is an obscure genus known as the long-eared wolf of South Africa, a creature very seldom seen even as a mounted museum specimen.

Our own familiar raccoon seems to belong to another of these conservative animal houses; he is quite primitive in many of his characteristics, and seems to tie back to an animal that was neither raccoon nor dog but a bit of both, some thirty-five or forty million years ago.

Neither Dog Nor Cat

Back of that, however, there is a still older animal ancestry, a group of flesh-eaters that were neither dog nor cat nor bear nor fox nor raccoon. Scientists studying their bones, or anybody looking at the restorations that artists have sketched over those fossil frameworks, can see things about them that suggest any or all of those animals. They are evolutionary grab-bags, out of which natural selection will pull assortments of anatomical and physiological features, assembling them in patterns that best fit the environment of the moment, and starting them on their careers as ancestors or as lines of descent that run into blind alleys and die out.

Away back at the beginning of the age of mammals, estimated at about sixty million years ago, there was a whole block of these creatures of mixed evolutionary potentialities, known collectively as the Creodonts. Some of the members of this heterogeneous tribe looked something like hyenas, others like compromises between wolves and wildcats. But all of them except one line got into evolutionary culs-de-sac, and they have no modern descendants.

The one excepted line, represented by a primitive little animal about the size of a foxterrier and known as *Miacis*, seems to have been the fundamental stock from which all present-day land-dwelling flesh-eaters descended.

Little enough is known of *Miacis*. He lived so long ago, he was so small that his bones had less chance of being fossilized than those of bigger creatures, and perhaps there weren't very

many of him anyway. However that may be, there isn't a complete *Miacis* skeleton in any museum today; nothing but a few skulls and a larger number of other miscellaneous bones. So we can't make a very certain picture of what he looked like. But the skulls do seem to be a converging-place for the characteristics that later developed in such diverse lines of evolution as dogs, weasels, cats and raccoons.

Beginning then with *Miacis*, Prof. Mathew traced the descent of the dog. In the second of the five geological periods that together make up the Age of Mammals, *Miacis* had two lines of descent that are of significance so far as dogs and their relatives are concerned. One of these, known as *Daphoenus*, was the ancestor of the bears and of those strange monsters the "bear-dogs" that at last came to be bigger than any bear. These latter must have been the most formidable fighting and killing animals that ever lived.

The other line is represented by a small animal, intermediate between dog and fox in general appearance and about the size of a fox, which has been named *Cynodictis*. It differed from both dog and fox, however, in having a most extraordinarily long tail, like a cat. Its long, flexible neck, too, was rather sug-



"Highbrow Dog"

But *Borophagus*, restored here by Charles R. Knight, was only a noble bluff: his bulging forehead was mostly bone, and his brain was small. Lower picture: skull of *Borophagus* (right) compared with skull of a modern wolf.

gestive of the cats; though by this time the descent was quite definitely committed in the dog-direction.

With the coming of the next, or middle, geological stage in the Age of Mammals, according to Prof. Mathew, there were seven distinct lines of animal descent in the dog tribe, as many as there are today. One of these was the first of the giant "bear-dogs"; another the first of all bears, though still sufficiently dog-like to be called *Hemion*, which is Greek for "half-dog." From here on the bears came down in a pretty straight line. One of the middle stages had such a peculiar skull that it has been called *Hyaenarctos*, or "hyena-bear." A later type of bear, that lived during cave-man times, was exceedingly short-nosed, and must have presented a comically stupid appearance to our skin-clad forefathers.

Dog With Cat's Teeth

But the main line of dog descent kept to moderate size—about the proportions of a coyote or a little smaller—and to a structure and general appearance that was becoming decidedly wolf-like. From this ancestor Prof. Mathew drew five lines of descent. One, the direct line, leads to the genuine wolves, which were fully developed by the time the latest Ice Age came, two or three hundred thousand years ago. One leads to the foxes, and one to a peculiar animal in South Africa, known as the long-eared wolf, though it is no bigger than a fox and is not a true wolf.

Two of the lines of descent ended in types long since extinct. One was an animal about as big as wolf, known as *Aleurodon*, which means "cat-tooth," because some of its teeth were more cat-like than dog-like. In other respects, however, it was an unquestionable dog.

The second of these lines of descent included a most curious thick-headed dog, known as *Borophagus*, which translates as "gluttonous eater"—probably a safe enough assumption to make about so gross-bodied an animal. The most striking feature about the *Borophagus* skull is the abrupt height of the forehead, as compared with that of the highly intelligent modern police dog, or the wily wolf of the timber. This gave the animal its nickname of "the High-brow Dog"; and Prof. Mathew said that while his field party was digging for fossil skulls of this species the irreverent bone-searchers often referred to it as "Professor Borophagus." But alas for appearances! Behind that bulg-



A CREODONT: NEITHER CAT NOR DOG

A CREODONT: NEITHER CAT NOR DOG

But possessing some of the characters that later developed in several different lines of carnivores. It was a primitive Creodont, *Miacis*, that was the common ancestor of all modern dogs, foxes, bears, etc. This restoration painting is by Charles R. Knight.

ing brow was only bone: its brain cavity was considerably smaller than that of a modern dog of the same size.

It was a wolf of the Ice Age that begat sons which are our wolves of today, and also our dogs, trustiest and most intelligent friends that man has in the animal world. It is easy to see the wolf in an Alsatian shepherd or even in a heavy-boned, wrinkle-faced St. Bernard; a little more difficult, perhaps, in such effeminate degeneracies as Pekes and Poms and Mexican hairless pups.

Offspring of the Wolf

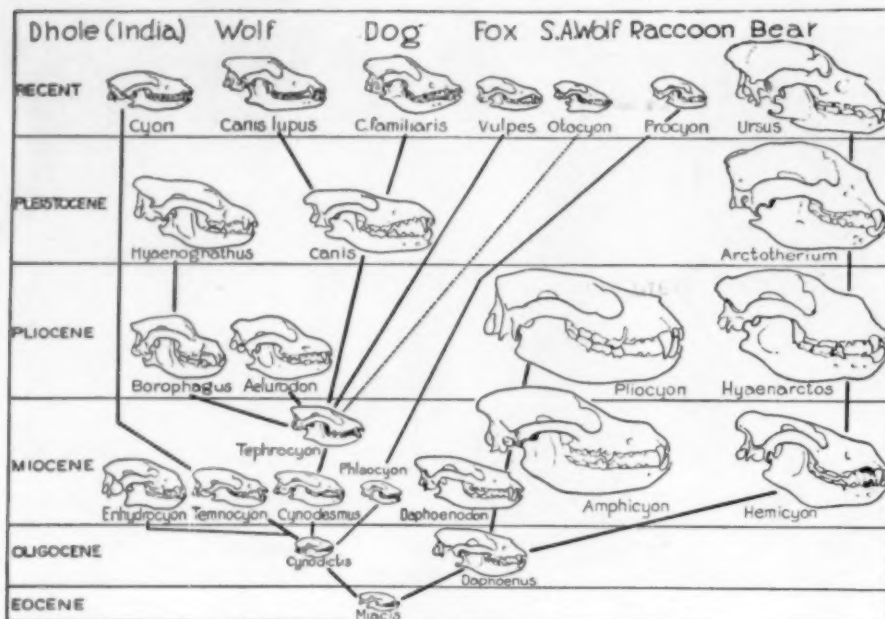
Yet even these are wolves' offspring; and the spark of spunk that sometimes sets a lapdog to yapping at a policeman is a not-quite-extinguished souvenir of the days a hundred thousand years ago when the first half-tamed wolfdog stood in the entrance of a cave which he shared with a man almost as shaggy as himself, and barked defiance at a prowling enemy.

With the theories held by some scientists, that the modern domestic dog is a mixed-blood animal, part wolf, part jackal, perhaps part fox, Prof. Mathew did not agree. He could not find any evidence in the fossil record of anything but wolf in the ancestry of the dog. In this contention he had the support of Dr. J. W. Gidley and Gerritt Miller of the U. S. National Museum. Most dog lovers will hope he was right

for a wolf is certainly a more worthy beast of prey than a fox or a jackal.

The line of descent that led from little *Miacis* of half a hundred million years or more ago down to the modern wolves and dogs has been a direct and definite one, as though the animal were being guided to a given goal, with the penalty of extinction for turning aside visited upon its errant brothers who perished by the way. The originally slim, lithe, rather weasel-like body has become deeper, shorter and more compact. The legs, especially the foreleg and ankle portions, have become longer, trimmer, better adapted for long running. The foot raises itself ever more definitely on the toes, and the claws, once more or less retractile like a cat's, remain permanently out to give firmer purchase on the earth in running. The once long tail is now much shortened. The jaws have become longer and the eyeteeth larger and sharper, fitting the animal for a running, slashing attack.

The dog's second cousin, the cat, has developed in a wholly contrary direction. Its body remains more slender and lithe, permitting stalking approach upon the prey. The legs, though powerful, are shorter. The paws, which turn inward more easily than those of the dog, are armed with curved hooks for claws. The shorter jaw is a holding weapon, not a slashing one. The whole animal mechanism is set for a stealthy approach



FAMILY TREE OF THE DOG AND HIS KIN

As drawn up by the late Prof. W. D. Mathew of the University of California. Note the gigantic size of some of the extinct "bear dogs."

under cover and a sudden leap at the shoulders and neck. If the first pounce fails, the prey will probably escape; the cat cannot pursue its quarry for miles as a pack of wolves or hunting dogs will do.

Dogs' Social Development

The only cat-like animal that hunts like a dog, the cheetah of southeastern Asia, is built more or less like a dog: long-legged, armed with claws that cannot be withdrawn, rather longer-jawed than most cats.

The secret of these diverging modes of development in dogs and cats, Prof. Mathew indicated, lies in the kind of country each line chose for its habitation. In the forest, which is the natural home of cats, there is cover behind which the hunter can lurk, and there are natural paths down which the intended prey may be expected to come. But dogs developed in open lands, on the prairies and plains, where hiding is not very good and where the herbivorous beasts are longer-legged and fleet. One must therefore be able to give chase and follow, if necessary, for miles.

Prof. Mathew pointed out that the environment probably influenced not only the dog's physical frame but his mental makeup as well. Dogs are social; they hunt in packs. Cats are solitary as a rule. Why?

Pack-hunting gives much better chance of success where pursuit has to go on for miles and hours. The pack

can spread out, preventing the quarry from doubling. When the prey is at last overtaken, the hunters can take turns leaping and slashing; everything need not be staked on one pounce of one animal. In the open there is greater strength in numbers.

But in the jungle, where the cats hunt, there need be no long pursuit, no repeated leap and slash. One pounce suffices to bring down the prey. And if one has no hunting companions one need not share the meat. So cats can be solitary.

This has influenced the respective degrees of domestication to which it has been possible to bring cats and dogs. Cats do not form permanent associations with their own kind; they make no friends, have no loyalties. Why then bother to find friends among an alien species, like man—unless you can get something out of him? So the cat continues to walk by herself.

But the dog, accustomed by long ages of pack-hunting and friendly living with other creatures of his own species, is naturally social. He has some notions of the advantages of mutual effort toward a common end. He knows something about loyalty toward a leader, toward a tried mate. It is therefore not so hard for him to take a two-legged creature into a hunting partnership, or to elect him to the high privilege of loyal friendship.

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ENGINEERING

Electric Heating Keeps Chickens Warm

BOILING water with electricity to keep chickens warm is the unusual job that has been undertaken by a combination of mechanical and electrical engineering at a big poultry farm near Edinburgh.

Chickens rather than humans, according to the English technical weekly, *Engineering*, are getting the benefit of the latest advances in both fields of engineering. Not only are nearly 100 per cent. efficient electric boilers being employed, but use is made of a seldom-used device, the steam accumulator. The accumulator, installed for safety's sake, stores up steam and prevents a failure in supply that might cause two million chickens to die.

Warm air, changed twenty times every hour, is carried to the brooder rooms and circulated over the radiators by means of fans. All controls, including those of the boilers and accumulator, are automatic. Except for the supervision of an electrician in the daytime, the apparatus receives no attention.

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ICHTHYOLOGY

Unlike Relatives, Trout Prefer to Stay Home

UNLIKE those fish that are caught traveling many hundreds of miles from home, as evidenced by tags placed on them in the home waters, Wisconsin trout seem to prefer the comforts of home to travel through the seven seas.

At least this was indicated by recent experiments when trout caught, tagged, and returned to Wisconsin streams were recaptured from one to several weeks later within a quarter of a mile of the spot of original capture. Many of them apparently had not moved at all from their favored bit of water.

Wisconsin, which already has many fish spawning sanctuaries, recently established 96 more for trout, bass, pike, and pickerel.

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Nearly 200 schemes for calendar reform have been presented to the League of Nations.

The use of soybeans goes back to the beginning of China's agricultural age under Emperor Shen Nung.

GENERAL SCIENCE

Research Results Lie Fallow Unless "Sold" to Public

Time Should be "Ripened" if Not Found Ready Ripe for Announcement of Discoveries, Says Prof. Bancroft

A GREAT scientist must also be a great salesman if he wants his discovery to be understood and welcomed in his own time. This idea was advanced at the dedication of the Science Hall of the University of Southern California by Prof. Wilder D. Bancroft of Cornell University.

There is more danger of a great new idea's not being accepted than most people realize, said Prof. Bancroft. To be received by the multitude of non-discoverers an idea must obviously be acceptable to them in some way or other. This is one of the most fundamental of all questions involved in human progress and at the same time one of the most difficult.

Quoting a great chemist of last century, Prof. Bancroft continued, "When the prospective genius has done his great work and has communicated it to the world, one likes to think that he can go quietly to bed and wake up famous the next morning." This, however, hardly ever happens. Very often the work of getting the new idea accepted is scarcely less than that of originating it.

"In many cases the man who has had the idea is not able to get it accepted and this task falls to the lot of another man who may be less clever, but who speaks a language which makes the world conscious of the treasure which it had been offered in obscure words."

Prof. Bancroft said that a new discovery is accepted for one of four reasons. It is accepted because it is made by a man of recognized authority or of personal magnetism, because it clears up points over which people have puzzled or because it shows what to do next, because of extensive proofs, or because the results are useful or striking.

If a good idea falls flat it is customary to say that the time was not ripe for it. However, it may be possible in some cases to change the temper of the time or as Prof. Bancroft said, to "ripen time." "To ripen time," said Prof. Bancroft, "we must establish our view by many proofs; we must discover something for which the world is ready; we must educate the world up to our dis-

covery; or somebody else must educate the world for us."

Dr. Bancroft gave many examples to show that new discoveries had often to wait many years before being accepted by scientific men. Avogadro's law, fundamental in modern chemistry, was formulated in 1813 but had to wait over 40 years before trained chemists really understood and believed in it.

Did Not Get Credit

A Russian chemist, Lomonosoff, who lived from 1711 to 1765, had views on oxidation, the wave theory of light and the nature of heat that were from 50 to 100 years in advance of his time. Thus credit for his discoveries, which were many, has been distributed among others. Even today his name is little known. It is only a few years since his work was rediscovered and reprinted by a fellow-countryman.

"One cannot count on having someone else exploit one's discoveries and the worker in pure science will not and should not limit himself to discovering only those things which the world knows that it wants," concluded Prof. Bancroft. "Consequently, he must make up his mind to sell himself to the scientific world. . . . Since the greatest discoveries are likely to be the ones for which the world is least ready, we see that the greatest scientific men should really be super-salesmen."

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ARCHAEOLOGY-PHYSICS

Mummy's Interior Studied Without Spoiling Exterior

WITH THE USE of X-ray photographs such as these, Dr. William H. Fox, director of the Brooklyn Museum, and Harold G. Petsing, of the Westinghouse Company, have been able to determine the condition of a mummy's interior without spoiling the specimen for exhibition purposes.

The photograph on the left revealed a beautiful specimen and showed two small jars, whose existence was pre-

viously unsuspected, wrapped close to the head. The other mummy, normal on the outside, was found by X-ray examination to be greatly disturbed within. The head was detached and turned around so that it pointed down; the lower jaw bone and most of the teeth were missing; and most of the bones were collected in a confused mass in the center of the body.

X-ray studies of mummies have also been made by Roy L. Moody on specimens supplied by several museums.

Science News Letter, July 11, 1931

ORNITHOLOGY

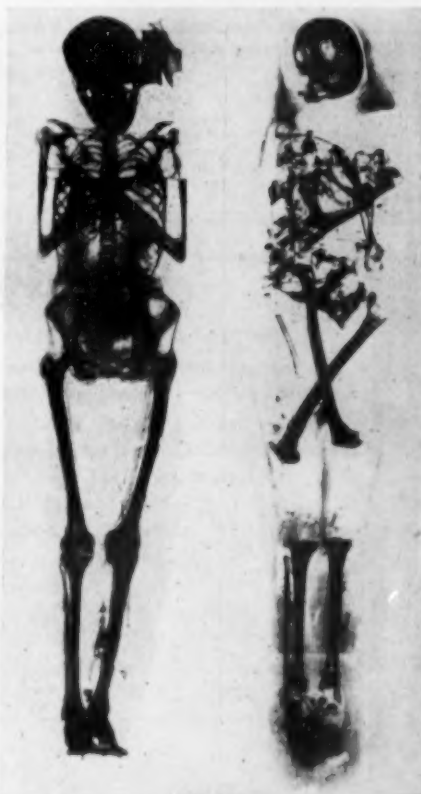
Trumpeter Swans Again Nesting in Yellowstone

THE APPEARANCE of eight pairs of trumpeter swans was reported in Yellowstone National Park during May, which is their nesting period.

Conservationists hail this as good news, for these majestic birds are one of the species which are facing extinction under changing conditions, and the Yellowstone is one of the points where it is hoped to check the ebbing tide.

Unless the few remaining trumpeter swans in existence can nest and rear their young safely, the species will soon join the dodo and the passenger pigeon.

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THE NEW STUDIES THE OLD

ANTHROPOLOGY

"Healthy Savage" Myth Hit by Research on African Natives

Akikuyu Suffer From Monotonous, Ill-Balanced Diet; Women Better off Than Men Because of Tabus

POPULAR THEORY that savages are healthier than civilized men, chiefly because of their diet, has been well discounted in a report of a three-year research into the physique and health of two African tribes. This prolonged study was made by Dr. J. B. Orr, director of the Rowett Research Institute for Animal Nutrition at Aberdeen, Scotland, and Dr. J. L. Gilks, director of Medical and Sanitary Service, Kenya, East Africa.

The report, published by the British Medical Research Council, is a scientific study of the diets and diseases of two East African tribes, the Masai, famous as lion-hunters and the Akikuyu.

These two tribes, although they live according to nature, are not the healthy, robust creatures the native free from civilization's restrictions is generally supposed to be. They have not balanced their food ration. The Akikuyu diet is

too rich in carbohydrate and deficient in calcium, while the Masai have insufficient carbohydrate and cellulose vegetables, that is, not enough roughage. The report points out that improvement might be brought about by increasing the use of green vegetables by both tribes, and of milk by the Akikuyu.

A special study was made of the Akikuyu dinner-table. It was found that the ordinary meal consists of a thick porridge called "irio" and a gruel called "ucuru," but the women make a special "irio" of their own, which no males over five years of age eat. In this dish, green leaves and salt are added to the ordinary maize, legumes and plantains. The women have a virtual monopoly of green leaves, and also have a weakness for edible earths and for ashes.

Low in Minerals

Analysis of samples of these native dishes at the Rowett Research Institute showed that the ordinary "irio" and "ucuru" were very low in the mineral elements vital to nutrition, particularly in calcium.

On the other hand, the leaves eaten by the women were very rich in certain minerals, the percentage of calcium in some being higher than that previously

recorded in any natural foodstuff. Some of the edible earths were very rich in iron, and one special delicacy, a red millet, which is eaten before and after childbirth, contained fourteen times as much calcium and sixteen times as much manganese as ordinary millet.

The significance of these discoveries lies in the effect which the larger "iron ration" eaten by the women has upon their health, as they are admittedly superior to the men in physique, and appear to be more healthy and freer from pulmonary diseases.

One of the native chiefs was asked why the men did not follow the example of their wives and eat green leaves.

"Such food prevents them from being swift of foot if defeated in battle by the Masai," he replied.

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PSYCHOLOGY

Children Are More Alert Than Their Teachers

THAT children's queries show they are far more alive to their mental requirements than the educators who prepare courses of study for them is the belief of Prof. R. A. Baker of the College of the City of New York. Prof. Baker is secretary of the division of chemical education of the American Chemical Society.

It is the children who are awake and the educators who are asleep, declared Prof. Baker. "No child is too young to learn chemistry, for example, yet we have ruled that until a student reaches a certain year in high school he is not sufficiently advanced to undertake the study of this science. . . .

"It is time that we were awakening to the fact that chemistry does not belong to the chemists but to the whole world. There are many things about chemistry that, if properly presented, kindergarten children could grasp. Children have the right to a full and useful education and this of necessity includes a study of chemistry.

"Some of the makers of games and educational toys have been keen enough to appreciate the type of thing which naturally appeals to children and have developed various experimental sets to answer this need. Unfortunately, the misguided use of this material frequently leads to entirely incorrect conclusions and mistaken ideas. . . . The time is coming when educators will no longer be able to impose arbitrary age limits governing the study of science or any other subject."

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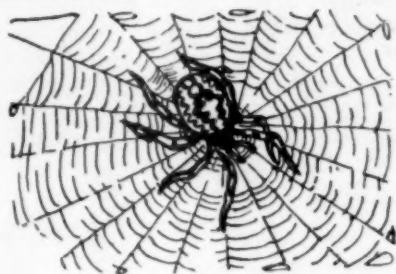
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Garden Spiders

HANDSOME though repulsive, the fat garden spider hangs head downward in the center of the marvelous fabric that it would seem no living thing would have the skill to construct. It is little wonder that the ancients looked upon the spider as a transformed weaver, so skillful that she had had the hardihood to challenge the goddess Athena. Even yet the name, "arachnid," given by scientists to the whole spider clan, is a monument to the proud and luckless weaver Arachne.

If one has the patience to watch the work of one of these orb-weaving spiders, some quiet, warm night, he will see a sight that will make him wonder whether after all, there isn't something in the old legend of a bewitched intelligence back of it. First Arachne stretches a rough polygon of cables between the twigs, by dropping for the vertical members, and by swinging or leaping for the horizontal strands. Then she criss-crosses this with the radiating spokes of her wheel; these also are strong threads, without any sticky stuff on them. Next she runs in one wide-spaced spiral, again without any glue. Finally she works in the close-set, sticky, fine meshes of the web, that constitute the real working parts of her snare. As a finishing touch, she writes her signature in broad, zig-zag strokes of white at the center, and then takes her station, with a foot on each of the radiating signal-lines, to wait for customers.

If one sees a second spider, considerably smaller than the web-maker, hanging around, that is Arachne's husband. He is one of the unfortunate of the earth. His mistress tolerates his presence during the courtship, but after the wedding she eats him.

Science News Letter, July 11, 1931

MEDICINE

Studies Show That Alcoholism May be Part Cause of Pellagra

EVIDENCE that pellagra, the distressing skin ailment which has become known as the hardtimes disease of southern states, may be caused by alcoholism as well as by improper diet was recently presented to the Medical and Chirurgical Faculty of Maryland by Dr. Thomas R. Boggs, chief physician to the Baltimore City Hospitals.

With Dr. Paul Padgett of Baltimore, Dr. Boggs has studied cases of pellagra at the hospital during two ten-year periods, from 1911 to 1920 inclusive and from 1921 to 1931. They found that alcohol is playing an increasing part in the development of pellagra.

In the first period, there were 24 cases of the disease. Five of these cases, or 20.8 per cent., were due to excessive use of alcohol. In the second period, however, there were 78 cases of which 35, nearly half, were of alcoholic origin. The increase in the total number in the second ten-year period corresponds to the increased capacity of the hospitals, Dr. Boggs explained, and to the increased total admissions, so that the greater percentage increase of alcoholic cases is truly representative of the alcoholism and not merely of a greater total admission.

Vitamin G Needed

This research of Drs. Boggs and Padgett suggests possible additional factors in the cause of this disease which has made its appearance rather recently in the United States, although it was known for centuries in Europe. At first it was thought to be caused by a germ and to be contagious. This theory was disproved by studies made by Dr. Joseph Goldberger and associates of the U. S. Public Health Service. These scientists declared that their investigations showed it was due to lack of an important factor in the diet which they called vitamin G. This factor is found plentifully in lean meat, milk, eggs, and yeast, and in smaller amounts in some vegetables.

This vitamin factor is certainly basic in the cause of the disease, Dr. Boggs said.

"But alcohol per se or other substances in the present day bootleg supply may play a part," he continued.

It may be that the liquor acts to inhibit the vitamins, and so causes the disease, or the disease may occur purely because of the irregular and insufficient food supply of the man on a spree, Dr. Boggs suggested. This last, however, would not apply so well to the regular heavy drinker, he thought.

Pellagra is primarily a skin disease with a characteristic eruption and discoloration. It looks somewhat like a severe sunburn, and attacks the hands more severely than any other part of the body. It has also nervous complications and rather serious mental disease develops in advanced cases of pellagra.

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ANTHROPOLOGY

"Giant" Indian Skeletons Turn Out to Be Ordinary

AGAIN a find of allegedly "giant" skeletons in an ancient Indian burial ground turns out to be a lot of perfectly ordinary burials of rather ordinary redmen. Two scientists from the University of Illinois investigated the recently reported find at Edgemont, near East St. Louis, Ill., and have reported to Science Service that there is nothing out of the ordinary about the skeletons at all.

When first discovered by workmen, the skeletons had fallen apart somewhat, due to the complete decay of the tendons and cartilage connections that had once held the bones together. Not allowing for this false increase in height, the workmen measured the bones as they lay, and reported a race of giants eight or nine feet tall. This failure to allow for the lengthwise shifting of the bones after the decay of all the connecting tissues is the common cause of erroneous reports of "giant skeletons" that get into circulation, explains Dr. A. R. Kelly, University of Illinois anthropologist.

Another unfortunate error made by the workmen was the complete removal of the bones from the positions where they were found, which made it impossible for the anthropologists to confirm the report that the skeletons were found face downward in two convergent lines.

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• First Glances at New Books

Anthropology

UP FROM THE APE—Earnest A. Hooton—*Macmillan*, 626 p., \$5. One of the best-known of American anthropologists gives here a demonstration of how a scientific book can be written to be effective upon two audiences at once. It is packed with authentic information and up to date, so that it will be useful to the professional scientist; it is vividly and vigorously written, spiced with keen humor and illustrated with fine half-tones and well-thoughtout diagrams, so that it will hold the attention of the layman. About half the book is given to a discussion of the comparative anatomy and physiology of the primates, from Lemur to Man; the rest is divided between fossil ancestors and contemporary races.

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Poetry—Nature

GREEN RIVER—James Whaler—*Harcourt, Brace*, 153 p., \$2. All students of the history of American natural science, and of American biography generally, will agree that the story of Rafinesque, the vivid, the adventurous, the stormy, the now almost legendary, should best be told in verse. Here this task is undertaken, with no small measure of success, by one who is a competent naturalist as well as a competent poet.

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Engineering

BRIDGE ENGINEERING—Frank O. Duffour and C. Paul Schantz—*American Technical Society*, 374 p., \$3. A handbook in which the authors have attempted to make the material appealing and of value to the technically trained expert, the beginner and the self-taught taught practical man.

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Psychology

THE ART OF STUDY—T. H. Pear—*Dutton*, 117 p., \$1.50. Very helpful to young students.

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Home Economics

MARGARINE AS A BUTTER SUBSTITUTE—Katharine Snodgrass—*Food Research Institute, Stanford University*, 333 p., \$3. This monograph is one of the Fats and Oils Studies of the Food Research Institute. It is a valuable book and should interest a wide range of readers, from the housewife to the dairyman, nutritionist or economist. The

present status of both butter and margarine industries, their past histories, methods of production, markets, and state and federal legislation are all described in non-technical language.

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Volcanology

VOLCANOES—G. W. Tyrrell—*Thorn-ton Butterworth*, 252 p., 2s 6d. An excellently written and very useful addition to the Home University Library series. A most astonishing quantity of real volcanology, in a form assimilable by the layman, is packed within its modest covers.

Science News Letter, July 11, 1931

Electricity

THE BOOK OF ELECTRICAL WONDERS—Ellison Hawks—*Dial Press*, 316 p., \$3. An amazing amount of electrical information is presented in pleasant and readable style, amply illustrated and indexed. The author traces electrical developments from the lodestone of the ancients up to the newest television methods, and is never submerged in the technicalities of his subject.

Science News Letter, July 11, 1931

Physics

THE LAW OF GRAVITATION IN RELATIVITY—H. C. Levinson and E. C. Zeisler—*University of Chicago Press*, 127 p., \$3.50. This is a mathematical derivation of the laws of gravitation from the postulates of general relativity theory. The first section of the book outlines the methods of tensor analysis.

Science News Letter, July 11, 1931

Genetics

HEREDITY—A. Franklin Shull—*McGraw-Hill*, 345 p., \$3. Dr. Shull has taken full advantage of the advances that have been made in his science since the appearance of the first edition of this book five years ago.

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Biography

CADILLAC—Agnes C. Laut—*Bobbs Merrill*, 298 p., \$3.75. Probably, to the great bulk of the American population, the name Cadillac signifies only a fine motor car. In the Detroit neighborhood, people know a little more about the forceful, far-seeing Frenchman who founded their city and played a large part in the building of New France. This popular biography will do much to give the story of Cadillac the wider knowledge which his labors merited.

Science News Letter, July 11, 1931

Astronomy

ASTRONOMY—Forest Ray Moulton—*Macmillan*, 549 p., \$3.75. This new text will be welcomed by astronomers. The account of the planetesimal theory of the origin of the solar system, which he advanced in collaboration with Prof. T. C. Chamberlin, is of particular interest, as is the part concerning the fate of meteorites striking the earth, a subject he has recently studied.

Science News Letter, July 11, 1931

Science Popularization

RELATIVITY, AN INTERPRETATION OF EINSTEIN'S THEORY—M. Palmieri—*Forbush Printing Co.*, 87 p., \$2. The author attempts to explain the Einstein theory to the general reader.

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Paleobotany

PLANT LIFE THROUGH THE AGES—A. C. Seward—*Macmillan*, 601 p., \$10. One of the foremost English botanists, who has spent many years on the problems of plant life in the earlier ages of the world, here makes the ripe fruit of his scholarship available in a form that will appeal not only to the professional reader but also to the more serious layman. The illustrations are clear, diagrammatic and well-labelled. The botanical reader will welcome the 38-page bibliography, with its many titles.

Science News Letter, July 11, 1931

Education

EDUCATIONAL DIRECTORY, 1931—U. S. Office of Education—*Govt. Print. Off.*, 171 p., 35c. The directory lists names of more than 12,000 school officials, schools, and school organizations.

Science News Letter, July 11, 1931

Neurology

AN INTRODUCTION TO NEUROLOGY—C. Judson Herrick—*Saunders*, 417 p., \$2.75. This fifth edition of Prof. Herrick's book has been critically revised and many chapters entirely rewritten. It is a brief but remarkably clear presentation of a complex and difficult subject. It would still be too heavy for the average non-scientific reader, however. Designed for students in various fields—medicine, psychology, education, general zoology, comparative anatomy, physiology and sociology—the book concentrates on the principles of nervous function rather than on their application. A good feature is the combined index and glossary.

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